Abstract

A multi layered copper bond pad for a semiconductor die which inhibits formation of copper oxide is disclosed. A small dose of titanium is implanted in the copper surface. The implanted titanium layer suppresses the copper oxide growth in the copper bond pad by controlling the concentration of vacancies available to the copper ion transport. An interconnect structure such as a wire bond or a solder ball may be attached to the copper-boron layer to connect the semiconductor die to a lead frame or circuit support structure. In another embodiment, a titanium-aluminum passivation layer for copper surfaces is also disclosed. The titanium-aluminum layer is annealed to form a titanium-aluminum-copper alloy. The anneal may be done in a nitrogen environment to form a titanium-aluminum-copper-nitrogen alloy.